IN THE CLAIMS

Please amend the claims as follows where a copy of the claims with the amendments delineated are set forth below in accordance with the PTO guidelines. This listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of Claims

1. (currently amended) An automatic power control system for simultaneously adjusting an output power and an extinction ration of a laser diode comprising:

a bias current determination ~~logic~~ unit including:

~~logic~~ a first difference determination unit for determining an average power difference between a current measurement of an output power of the laser diode and a reference average output power, and

a first integrator communicatively coupled to receive the determined average power difference from the ~~logic~~ first difference determination unit, the first integrator summing the determined average power difference with a determined average power difference based on at least one previous measurement by the first difference determination unit resulting in a bias current output signal; and

a modulation current determination ~~logic~~ unit including:

a nonlinear processing block ~~including logic~~ for determining an absolute value of the current measurement adjusted by a nonlinear estimation reference constant,

~~logic,~~ a second difference determination unit communicatively coupled to the nonlinear processing block for determining a power variance difference between the determined absolute value and a reference power output variance proportional to an extinction ratio P_1/P_0 for reference power levels P_1 and P_0 wherein P_1 represents a digital one value and P_0 represents a digital zero value, and

a second integrator, communicatively coupled to receive the determined power variance difference from the ~~logic~~ second difference determination unit, the second integrator summing the determined power variance difference with a determined power variance difference ~~for~~ based on at least one previous measurement by the second difference determination unit resulting in a modulation current output signal.

2. (currently amended) The system of claim 1 wherein the bias current determination ~~logic~~ unit further comprises a low pass filter for filtering high frequency noise from ~~a~~ the current measurement ~~value~~, the low pass filter being communicatively coupled for receiving the current measurement ~~value~~ and for sending a filtered measurement value to the ~~logic~~ first difference determination unit for determining an average power difference between the filtered measurement value and the reference average output power.

3. (currently amended) The system of claim 1 wherein the modulation current determination ~~logic~~ unit further comprises a low pass filter for filtering high frequency noise from the determined absolute value ~~difference~~, the low pass filter being communicatively coupled for receiving the determined absolute value ~~difference~~ and sending a filtered signal to

the ~~logic~~ second difference determination unit for determining a power variance difference between the filtered signal and the reference power output variance.

4. (Original) The system of claim 1 wherein the system is implemented in a digital signal processor chip.

5. (currently amended) A method for maintaining a laser output signal about a reference average output power and about a reference extinction ratio comprising:

determining a bias current and a modulation current of a laser diode drive current for a reference P_1 power level and for a reference P_0 power level;

determining a reference average power and a reference power variance based upon the reference power levels P_1 and P_0; and

adjusting the bias current and the modulation current simultaneously for maintaining about the reference average power and about the reference extinction ratio including the steps of:

receiving a current measured output power value; and

adjusting for nonlinear estimation of the current measured output power value.

6. (currently amended) The method of claim 5 wherein determining ~~a~~ the bias current and ~~a~~ the modulation current of ~~a~~ the laser diode drive current for the reference P_1 power level and for the reference P_0 power level further comprises:

determining the bias current corresponding to the reference P_0 power level;

determining the bias current corresponding to the reference P_1 power level; and

determining the modulation current corresponding to the reference P_1 power level as the

difference between the bias current for the reference P_1 power level and the bias current for the reference P_0 power level.

7. (currently amended) The method of claim 5 wherein determining ~~a~~ the reference average power and ~~a~~ the reference power variance based upon the reference power levels P_1 and P_0 further comprises:

producing an optical power swing from the reference P_0 to the reference P_1 over a parameter estimation time period;

integrating measurement output power values received during the parameter estimation time period resulting in a bias reference current representing the reference average power; and

integrating absolute power values of the received measurement output power values adjusted for nonlinear estimation during the parameter estimation time period resulting in a modulation reference current representing the reference power variance.

8. (currently amended) The method of claim 7 wherein integrating measurement output power values received during the parameter estimation time period resulting in ~~a~~ the bias reference current representing the reference average power further comprises responsive to being within the parameter estimation time period, summing the current measurement with a feedback component including at least one previous measurement value.

9. (currently amended) The method of claim 8 wherein integrating absolute power values of the received measurement output power values adjusted for nonlinear estimation during the parameter estimation time period resulting in ~~a~~ the modulation reference current representing the

reference power variance further comprises responsive to being within the parameter estimation time period, summing the absolute value of the current measurement adjusted for nonlinear estimation with a feedback component including at least one absolute value of a previous measurement value adjusted for nonlinear estimation.

10. (currently amended) The method of claim 5 wherein adjusting the bias current and the modulation current simultaneously for maintaining about the reference average power and about the reference extinction ratio further ~~comprises~~ includes the steps of:

~~receiving a current measured output value;~~

determining a variation of the current measured output power value from the reference average output power;

integrating the variation of the current measured output power value with a first feedback component comprising at least one previously determined variation based on a previously measured output power value;

setting the bias current ~~output~~ based on the result of the integration of the variation of the current measured output power value with ~~a~~ the first feedback component;

~~adjusting for nonlinear estimation of the measured output power value;~~

determining a variation in an extinction ratio based upon the adjusted current measured output power value from ~~a~~ the reference extinction ratio;

integrating the variation in the extinction ratio based upon the adjusted current measured output power value with a second feedback component comprising at least one previously determined variation in the extinction ratio based on one of ~~a~~ the

previously measured output power value or another previously measured output power value; and

setting the modulation current ~~output~~ based on the result of the integration of the variation in the extinction ratio based upon the adjusted current measured output power value with ~~a~~ the second feedback component.

11. (currently amended) A system for maintaining a laser output signal about a reference average output power and about a reference extinction ratio comprising:

means for determining a bias current and a modulation current of a laser diode drive current for a reference P_1 power level and for a reference P_0 power level;

means for determining a reference average power and a reference power variance based upon the reference power levels P_1 and P_0; and

means for adjusting the bias current and the modulation current simultaneously for maintaining about the reference average power and about the reference extinction ratio including:

means for receiving a current measured output power value; and

means for adjusting for nonlinear estimation of the current measured output power value.

12. (currently amended) The system of claim 11 wherein the means for determining ~~a~~ the bias current and ~~a~~ the modulation current of ~~a~~ the laser diode drive current for the reference P_1 power level and for the reference P_0 power level further comprises:

means for determining the bias current corresponding to the reference P_0 power level;

means for determining the bias current corresponding to the reference P_1 power level; and

means for determining the modulation current corresponding to the reference P_1 power level as the difference between the bias current for the reference P_1 power level and the bias current for the reference P_0 power level.

13. (currently amended) The system of claim 11 wherein the means for determining ~~a~~ the reference average power and ~~a~~ the reference power variance based upon the reference power levels P_1 and P_0 further comprises:

means for producing an optical power swing from the reference P_0 to the reference P_1 over a parameter estimation time period;

means for integrating measurement output power values received during the parameter estimation time period resulting in a bias reference current representing the reference average power; and

means for integrating absolute power values of the received measurement output power values adjusted for nonlinear estimation during the parameter estimation time period resulting in a modulation reference current representing the reference power variance.

14. (currently amended) The system of claim 13 wherein the means for integrating measurement output power values received during the parameter estimation time period resulting in ~~a~~ the bias reference current representing the reference average power further comprises responsive to being within the parameter estimation time period, means for summing the current measurement with a feedback component including at least one previous measurement value.

15. (currently amended) The system of claim 14 wherein the means for integrating absolute power values of the received measurement output power values adjusted for nonlinear estimation

during the parameter estimation time period resulting in ~~a~~ the modulation reference current representing the reference power variance further comprises responsive to being within the parameter estimation time period, means for summing the absolute value of the current measurement adjusted for nonlinear estimation with a feedback component including at least one absolute value of a previous measurement value adjusted for nonlinear estimation.

16. (currently amended) The system of claim 11 wherein the means for adjusting the bias current and the modulation current simultaneously for maintaining about the reference average power and about the reference extinction ratio further ~~comprises~~ includes:

~~means for receiving a current measured output value;~~

means for determining a variation of the current measured output power value from the reference average output power;

means for integrating the variation of the current measured output power value with a first feedback component comprising at least one previously determined variation based on a previously measured output power value;

means for setting the bias current ~~output~~ based on the result of the integration of the variation of the current measured output power value with ~~a~~ the first feedback component;

~~means for adjusting for nonlinear estimation of the measured output power value;~~

means for determining a variation in an extinction ratio based upon the adjusted current measured output power value from ~~a~~ the reference extinction ratio;

means for integrating the variation in the extinction ratio based upon the adjusted current measured output power value with a second feedback component comprising at

least one previously determined variation in the extinction ratio based on ~~a~~ the previously measured output power value or another previously measured output value; and

means for setting the modulation current ~~output~~ based on the result of the integration of the variation in the extinction ratio based upon the adjusted current measured output power value with ~~a~~ the second feedback component.

17. (currently amended) A computer-usable medium comprising instructions for causing a processor to execute a method for maintaining a laser output signal about a reference average output power and about a reference extinction ratio, the method comprising:

determining a bias current and a modulation current of a laser diode drive current for a reference P_1 power level and for a reference P_0 power level;

determining a reference average power and a reference power variance based upon the reference power levels P_1 and P_0; and

adjusting the bias current and the modulation current simultaneously for maintaining about the reference average power and about the reference extinction ratio including the steps of:

receiving a current measured output power value; and

adjusting for nonlinear estimation of the current measured output power value.